CLAIMS

1. Electrical cable ~~which has predetermined properties of~~ fire resistance and of electric insulation resistance in the presence of moisture, this cable comprising a metal conductor and at least a polymer coating consisting of a double layer, in which the outer layer of this coating is constructed so as mainly to impart to the cable said fire-resistance properties, while the inner layer is constructed so as to impart to the cable said properties of insulation resistance in the presence of moisture while substantially contributing to the overall fire-resistance properties of said cable.

2. Cable according to Claim 1, in which said predetermined fire-resistance properties are such that said cable passes the test defined according to standard ASTM D2863 and the insulation-resistance properties in the presence of moisture are such that said cable passes the test defined according to standards CEI 20-22 and UL 44.

3. Cable according to Claim 1, in which the inner layer of said coating comprises a polymer matrix, an inorganic charge dispersed in this matrix and a predetermined amount of coupling agent such as to provide the desired insulation-resistance properties in the presence of moisture and the outer layer comprises a base polymer matrix and an inorganic charge dispersed in this matrix in an amount such as to

provide the cable with the desired fire-resistance properties.

4. Cable according to Claim 3, characterized in that this predetermined amount of coupling agent is between 1% and 20% by weight of the amount of base polymer.

5. Cable according to Claim 3, characterized in that this predetermined amount of coupling agent is between 1% and 10% by weight of the amount of base polymer.

6. Cable according to Claim 3, characterized in that this predetermined amount of coupling agent is between 2% and 6% by weight of the amount of base polymer.

7. Cable according to Claims 3, 4, 5 or 6, in which said coupling agent is an organosilane or a polyolefin compound which contains at least one unsaturation and at least one carboxyl group in the polymer chain.

8. Cable according to Claim 7, characterized in that said organosilane is chosen from g-methacryloxypropyltrimethoxy-silane, methyltriethoxysilane, methyltris(2-methoxyethoxy)silane, dimethyldiethoxysilane, vinyltris(2-methoxyethoxy)silane, vinyltrimethoxysilane, vinyltriethoxysilane, octyltriethoxysilane, isobutyltriethoxysilane and isobutyltrimethoxysilane, and mixtures thereof.

9. Cable according to Claim 7, characterized in that said polyolefin compound is a carboxylated polyunsaturated polyolefin in which the polyolefin part is a poly(C_4-C_{16})alkylene with a polymerization number of from 10 to 1000 and the carboxylated part is derived from the reaction of said poly(C_4-C_{16})alkylene with an unsaturated carboxylic or dicarboxylic acid anhydride.

10. Cable according to Claim 7, characterized in that said carboxylated polyunsaturated polyolefin is a polybutadiene treated with maleic anhydride.

11. Cable according to Claim 9 or 10, characterized in that the ratio of the number of unsaturations to the number of carboxyl groups in the polyolefin compound is between 1:10 and 1:100.

12. Cable according to Claim 3, characterized in that the inorganic charge is a metal oxide or hydroxide.

13. Cable according to Claim 12, characterized in that said metal hydroxide is a magnesium or aluminum hydroxide.

14 Cable according to Claim 13 characterized in that in the inner layer of the polymeric coating of the cable main compound of mineral charge is an aluminum oxide or hydroxide.

15 Cable according to Claim 13 characterized in that in the outer layer of the polymeric coating of the cable main compound of mineral charge is a magnesium oxide or hydroxide.

16 Cable according to Claim 13 characterized in that in the inner layer of the polymeric coating of the cable main compound of mineral charge is an aluminum oxide or hydroxide and in the outer layer of the polymeric coating of the cable main compound of mineral charge is a magnesium oxide or hydroxide.

17. Cable according to any one of Claims 12 to 16, characterized in that the amount of inorganic charge in the inner layer is between 10% and 80% of the total weight of the polymer composition of the inner layer.

18. Cable according to any one of Claims 12 to 16, characterized in that the amount of inorganic charge in the outer layer is between 20% and 90% of the total weight of the polymer composition of the outer layer.

19. Cable according to Claim 17, characterized in that the amount by weight of inorganic charge in the inner layer is between 20% and 60% by weight.

20. Cable according to Claim 18 , characterized in that the amount of inorganic charge in the outer layer is between 30% and 75% by weight.

21. Cable according to any one of Claims 12 to 20, characterized in that the ratio of the carboxyl groups contained in the polyolefin compound to the hydroxyl groups of the inorganic charge is between 1:100 and 1:2000.

22. Cable according to any one of Claims 1 to 21, characterized in that the inner layer of the coating also contains a release agent.

23. Cable according to Claim 22, characterized in that the release agent is a saturated or unsaturated fatty acid or a derivative thereof in metal salt form.

24. Cable according to Claim 22 or 23, characterized in that said release agent is present in an amount of between 0.01% and 1% of the weight of the base polymer in the polymer composition of the inner layer.

25. Cable according to any one of the preceding Claims 1 to 24, characterized in that the outer layer of the coating also contains a predetermined amount of coupling agent which is capable of compatibilizing the inorganic charge with the base polymer, this predetermined amount being less than the amount of the inner layer.

26. Cable according to Claim 25, characterized in that said coupling agent is an organosilane or a polyolefin

compound containing at least one unsaturation and at least one carboxyl group in the polymer chain.

27. Cable according to Claim 26, characterized in that said organosilane is chosen from g-methacryloxypropyltrimethoxysilane, methyltriethoxysilane, methyltris(2-methoxyethoxy)silane, dimethyldiethoxysilane, vinyltris(2-methoxyethoxy)silane, vinyltrimethoxysilane, vinyltriethoxysilane, octyltriethoxysilane, isobutyltriethoxysilane and isobutyltrimethoxysilane, and mixtures thereof.

28. Cable according to Claim 26 or 27, characterized in that the amount of said coupling agent is between 0.1% and 2% of the weight of base polymer in the polymer composition of the outer layer.

29. Cable according to any one of Claims 1 to 28, characterized in that the inner layer of the coating also contains an organosilane in an amount of between 0.05% and 1.5% of the weight of base polymer in the polymer composition of the outer layer.

30. Cable according to any one of Claims 1 to 29, characterized in that the weight of the inner layer is between 1/4 and 3/4 of the total thickness of the coating.

31. Method for imparting fire resistance and electric insulation resistance following exposure to moisture of an electrical cable coated with an insulating polymer coating, this method comprising controlling the degree of fire-resistance in an outer portion of said coating, and controlling both the degree of fire resistance and of insulation resistance in the presence of moisture in an inner portion of said coating.

32. Method according to Claim 31, characterized in that the control of the degree of fire resistance comprises the addition of a predetermined amount of inorganic charge, while the control of the degree of insulation resistance in the presence of moisture comprises the addition of a predetermined amount of coupling agent.

33. Method for controlling the strippability of a coating layer from an electric conductor , the electrical insulation properties of said cable coating being kept constant after exposure to moisture, this method comprising adding to a polymeric composition forming said coating layer a predetermined amount of a polyolefinic compound, which contains at least one unsaturation and at least one carboxy group in the polymer chain.